FY 2013 Region 1 Refuge I&M Proposal

Submitted by: Pam Johnson, Wildlife Biologist & William Smith, Wildlife Biologist/Planner

Contact information: Pam_R_Johnson@fws.gov, 208-662-5423

Project title: Submerged Aquatic Vegetation (SAV) Inventory at Bear Lake, Grays Lake and Camas NWRs.

Primary individual responsible for completing the project: Pam Johnson, Wildlife Biologist, Camas and Grays Lake NWRs, Pam_R_Johnson@fws.gov, 208-662-5423

Project abstract:

Submerged aquatic vegetation (SAV) provides important habitat for many species of waterfowl, including trumpeter swans (*Cygnus buccinator*), a species of greatest conservation need. The breeding population of trumpeter swans in Idaho is classified as "critically endangered" by the State of Idaho due to reduced breeding habitat availability, significantly declining nest attempts, and localized low productivity. Low productivity in trumpeter swans is likely related to several factors, but the availability of food resources has been linked to several aspects of waterfowl reproduction. Due to the importance of 1) hydrology as a driver of wetland condition and 2) wetland food resources to breeding waterfowl, researchers and managers have recommended that the relationship of SAV and hydrology be examined to inform effective habitat and water management strategies that will increase abundance of SAV species with high nutritional quality (e.g., sago pondweed, *Stuckenia pectinata*) available for breeding waterfowl. Three refuges (Bear Lake, Grays Lake, and Camas NWRs) in the Southeast Idaho National Wildlife Refuge Complex support trumpeter swans and other breeding waterfowl, and have developed (or are currently developing) habitat management objectives for SAV. However, no monitoring of SAV communities has been conducted at Grays Lake and Camas NWRs and very limited monitoring has been done at Bear Lake NWR. Descriptions of SAV communities are also lacking from the recent habitat map for Camas NWR. This study will quantify the species composition and abundance of SAV and local hydrology at select management units/areas used by nesting trumpeter swans, assess the temporal scale of the SAV community within the wetland cycle, and examine the reproductive success of trumpeter swans in relation to SAV parameters. Database development for trumpeter swan productivity data will enable efficient compilation of legacy and future survey data. Permanently established transects and water staff gauge locations will be used to monitor SAV and allow for repeated sampling over time to assess trends.

Funding Priorities (check all funding priorities that apply to the project):

X	Inventory Project/Collection of Baseline Data	X	Adaptive Management
X	Data Compilation and Management	X	Protocol Development
X	Purchase of Equipment	X	Evaluate effects of environmental stressors, incl. climate change

X	Leveraging existing programs supporting surveys on refuges.		

Project objective(s):
1. Develop a methodology for baseline inventory and quantify species composition and abundance for submerged aquatic vegetation that informs refuge habitat objectives.
2. Assess the temporal scale of SAV community dynamics within the wetland cycle in relation to local hydrology (e.g., depth and duration of flooding) and long-term climatic conditions (e.g., Palmer Drought Hydrological Index, historical precipitation records);
3. Develop a database for tracking long-term productivity data of breeding trumpeter swans in Idaho.
4. Examine reproductive success of trumpeter swan in relation to availability and abundance of submerged aquatic vegetation at selected management sites.

Describe how project deliverable(s) will be used by the refuge staff for decision making:
Current baseline information is lacking to support time sensitive and controversial Refuge management decisions within the Southeast Idaho NWRC for more dynamic and variable hydrology to increase wetland productivity. Baseline data on composition and abundance of SAV will help refuge staff assess the success of water management practices and inform adaptive management strategies that increase food resources available to trumpeter swans and other breeding waterfowl.

Methods:
Sampling methodology will be developed by the Contractor and SEID NWRC biological staff through collaboration with refuge staff in R1 and R6 that have experience with SAV monitoring. For example, at Red Rock Lakes NWR, Braun-Blanquet methods have been used and Daubenmire class values recorded to estimate the percent canopy cover for each SAV species present. SAV sampling will be completed during the peak growing season at randomly stratified plots at permanently established transects. In addition to cover estimates for each species, plant height, stage of growth, and water depth at each plot will also be recorded. Water levels will also be monitored at staff gauges at least weekly from April through September.

Describe any statistical assistance, GIS, or database support needed: Database development support from the RO is needed for completion of objective #3.

Project implementation timeline:
        Methods Development: Late winter/early spring 2013
        Field Work: July-August 2013 (SAV); Apr-Sept 2013 (hydrology)
        Data Management: Nov 2013 – Feb 2014
        Progress Report: April 30, 2014
        Final Report: Oct 31, 2014 (1 month after project completion date)
        Peer-reviewed publication submitted: Dec 2014

Project completion date (and mid-completion date, if project extends into FY2014):
Mid completion date: April 30, 2014   Completion date: September 30, 2014

Briefly describe how the project will address each of the following Evaluation Criteria:

1. **Planning Connection**

    The proposed project connects directly to and supports the accomplishment of at least four high priority objectives in three Draft CCPs for the Southeast Idaho NWRC. The proposed project will facilitate the accomplishment of objectives for all refuges by providing baseline data on SAV to inform high priority management decisions regarding changes in hydrology and habitat management for waterfowl and other waterbirds.

    SAV abundance are critical I&M components related to evaluating the effectiveness of Bear Lake NWR highest priority objective (1.1 Tall Emergent Wetlands) as well as the highest priority sub-objectives (1.1a Open Water Habitat and 1.1b Submerged Aquatic Habitat). This project also assesses a Bear Lake Draft HMP objective (4.4.1.1.2 Submergent Habitat).

    The highest priority Camas CCP wetland objectives (1.1 Hemi-Marsh and 1.2 Shallow Marsh) mandate a Wetland and Riparian Rehabilitation Plan for Camas NWR by 2017 through an: "Assessment of hydrologic, geomorphic, and biologic features associated with target wetlands". Objective 4.1 (Inventory Habitat and Wildlife) and I&M Strategies emphasize inventories of the distribution and abundance of wetland habitat components.

    The central focus of the Draft Grays Lake CCP will include rectifying 65 years of static hydrology and its negative influence on wetland habitats and SAV productivity. The highest priority Grays Lake CCP objectives will emphasize restoration of wetland ecosystem integrity by restoring variable hydrology.

2. **Large Investment in Management Actions**

    Restoration and management of wetland impoundments at Bear Lake NWR have been supported by multiple large grants from NAWCA and Ducks Unlimited. The results of this project will go into an adaptive management framework to evaluate success of these actions and to inform future restoration and management. Camas and Grays Lake NWRs have incomplete information on SAV. After this project is completed, the SAV data can be integrated with the LiDAR-based DEM to build predictive models of SAV occurrence based on elevation and hydrology. Camas NWR will also use a major investment of funds and staff time to implement their proposal to create a more dynamic and variable hydrology in wetland units, including the restoration of Camas Creek.

3. **Partners**

    - The Trumpeter Swan Society: Coordinates surveys of breeding trumpeter swans and maintains historical productivity data.
    - Idaho Fish and Game: Interested in sampling SAV on Wetland Management Areas using the same methods to increase spatial extent of project.
    - Idaho State University: On-going graduate study on trumpeter swan nest success and cygnet survival.
    - Western Oregon University and Oregon State University: College volunteers to assist with trumpeter swan nest study and habitat/SAV work.

4. Controversy

Long-term productivity of wetland habitats, including SAV communities, requires periodic drawdown to reduce the accumulation of organic material that creates low-oxygen environments and reduces SAV or shifts SAV communities to a less desirable state. Recently developed Southeast Idaho NWRC CCP habitat objectives for variable and dynamic water management regimes will not be widely valued by public users, accustomed to "consistent" Refuge conditions for wildlife dependent recreation.

The irrigation storage demands and established current flood abatement purposes for the Mud Lake Unit at Bear Lake NWR will also make proposed SAV habitat improvements even more politically volatile and controversial. The restoration of Camas Creek and proposed increase in variable hydrology to improve SAV habitats at Camas NWR will evoke controversy with downstream water irrigators. The 1942 water schedule and its detrimental effect upon waterbird SAV habitat of Grays Lake NWR is one of the most highly controversial and politically charged issues within Region 1. Proposed SAV inventories will assist the Refuge in documenting the controversial effects of the altered hydrology upon trust resources and developing a mutually beneficial water drawdown schedule that satisfies both irrigators and wildlife needs.

At Grays Lake NWR, proposed SAV inventories will assist the Refuge in documenting the controversial effects of the altered hydrology on trust resources and developing a mutually beneficial water drawdown schedule that satisfies both irrigators and wildlife needs.

5 National I&M Priority

- Compiles legacy data related to breeding trumpeter swans.
- Identifying SAV communities can inform current habitat mapping (e.g., open water classification) at Camas NWR and future mapping at other refuges.
- Direct benefit to breeding trumpeter swans, identified as "critically imperiled" in Idaho.
- Planned benefit to water quality by informing management strategies that increase SAV, therefore improving water quality.
- Planned benefit to phenology with growth stage of SAV recorded that can be compared to future sampling data.
- Direct benefit to biotic (SAV) and abiotic (hydrology) inventories.

6 Project Design

Project objectives, refuge management decisions, and methods are described on pages 1 & 2 of this proposal. Contractors and at least one biotech will assist refuge biologist with field work, data management, reports, and logistics.

7 Data Management Plan

Description	Develop a baseline inventory of SAV vegetation and evaluate relation to hydrology for Bear Lake, Gray's Lake and Camas NWR.
Data	15% of overall project budget includes data entry, QA/QC, storage,

Management Budget	organization, backup. Region 1 Data Manager will develop database for trumpeter swan productivity.
Format	ArcGIS geodatabase for spatial (SAV sampling locations, nests, etc) and related data; Excel (SAV& water level data); SigmaPlot (graphs and analysis); Access (trumpeter swan productivity database)
Data Processing & Workflows	Field work to conduct sampling will utilize GPS technology and randomly stratified, permanent sampling transects. Data loggers (hourly measurements) and staff gauges will be used to monitor water levels throughout the growing season. All spatial data will be maintained in a geodatabase at refuge. Tabular data will be entered into excel; graphs and statistical analyses will be completed in SigmaPlot.
Quality Checks	All staff/contractors will work together to ensure consistency among observers for field data collection following project protocol. Data entry will be spot checked and outliers will be reviewed for accuracy. All calculations and analyses will be double-checked.
Backup & Storage	Data will be stored on at least two hard drive locations by the Contractor and on the USFWS complex server. Data will be uploaded by refuge staff to ServCat upon completion of the project.
Metadata	Metadata will be in FGDC format.
Restrictions	Not for public distribution because data includes location of sensitive species.
Contact	Pam Johnson, Wildlife Biologist, Pam_R_Johnson@fws.gov

8 **Continuity**

This project establishes new methodology for inventories currently lacking on NWRs in Southeast Idaho. The sampling design will be statistically robust and enable repeated sampling for future trend analysis. Sampling interval will be annually or as appropriate for decision making and adaptive management actions.

9 **Other Evaluation Criteria**

- Results of this project will be submitted for publication in an appropriate peer reviewed journal.
- Links with current survey efforts to monitor reproductive success of trumpeter swans in Idaho and GYE and broadens SAV monitoring currently done and planned in Region 6.
- A poster presenting results will be prepared and displayed at refuge visitor centers for the public.

Requested funding up to $40,000:

Item	FY13	FY14
Contracts/Seasonal Employees	$34,860	
Materials (data loggers, staff gauges)	$ 4,000	
FWS Personnel Costs		
Other (specify):		
FY TOTAL(S)	$38,860	

Note: all funding will be spent or obligated by the end of FY13; project completion date extends into FY14.